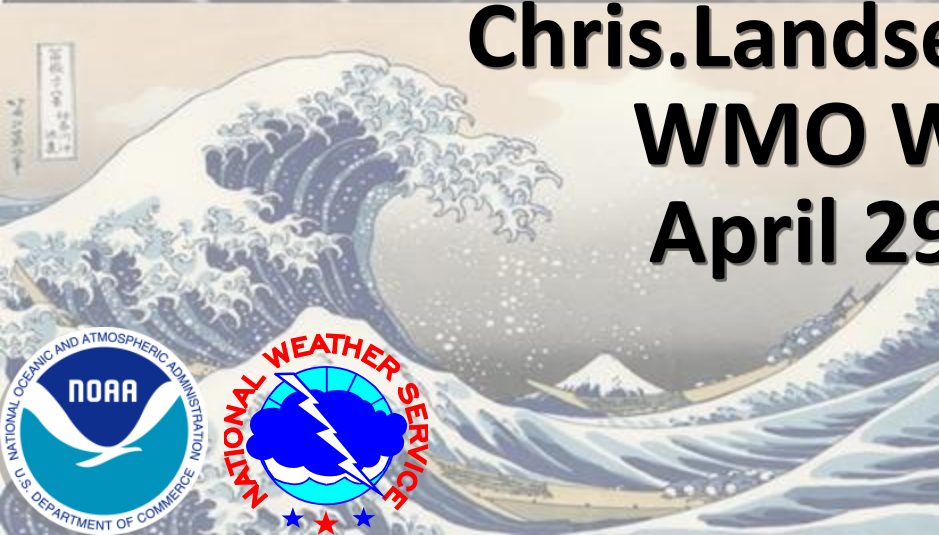


National Hurricane Center/ Tropical Analysis and Forecast Branch: Understanding Marine Forecast Products and Uncertainties

**Chris Landsea
Chief, TAFB**

**Chris.Landsea@noaa.gov
WMO Workshop
April 29th, 2019**



National Hurricane Center/Tropical Analysis and Forecast Branch: Understanding Marine Forecast Products and Uncertainties

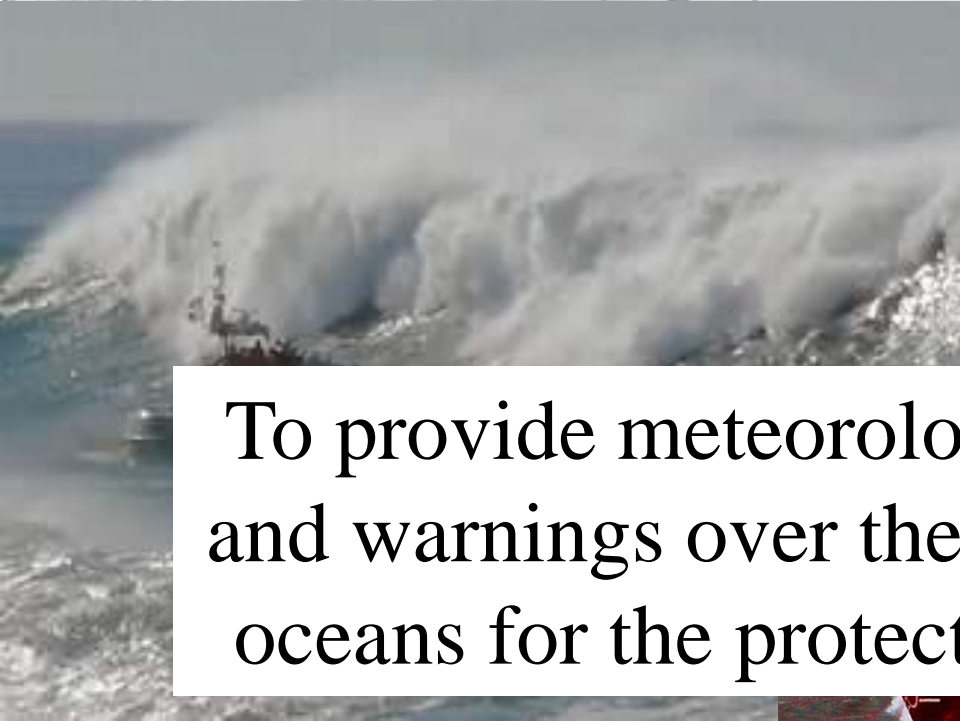
- **What/who is “Taff-Bee”?**
- **Why are marine forecasts important?**
- **How do we observe winds/waves over the ocean?**
- **What are TAFB’s products and their interpretation?**
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Tropical Analysis and Forecast Branch



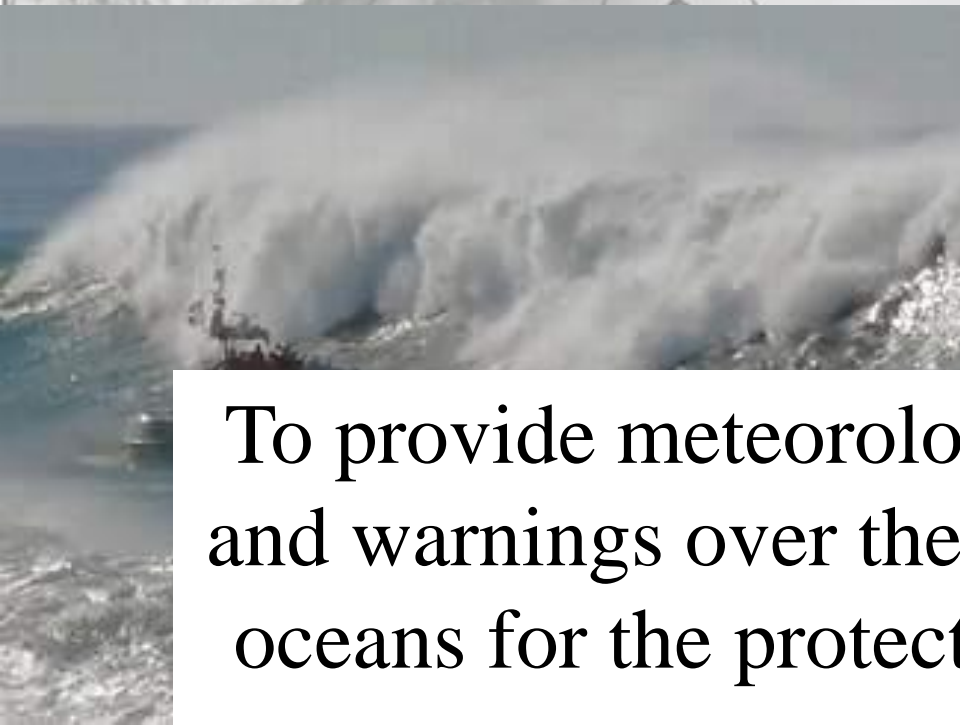
Tropical Analysis and Forecast Branch



To provide meteorological analysis, forecasts and warnings over the tropical and subtropical oceans for the protection of life and property



Tropical Analysis and Forecast Branch



To provide meteorological analysis, forecasts and warnings over the tropical and subtropical oceans for the protection of life and property

Atlantic Marine Forecaster – 1-305-229-4424

Pacific Marine Forecaster – 1-305-229-4425

<https://www.nhc.noaa.gov/marine/?atlc>

A Bad Cruise

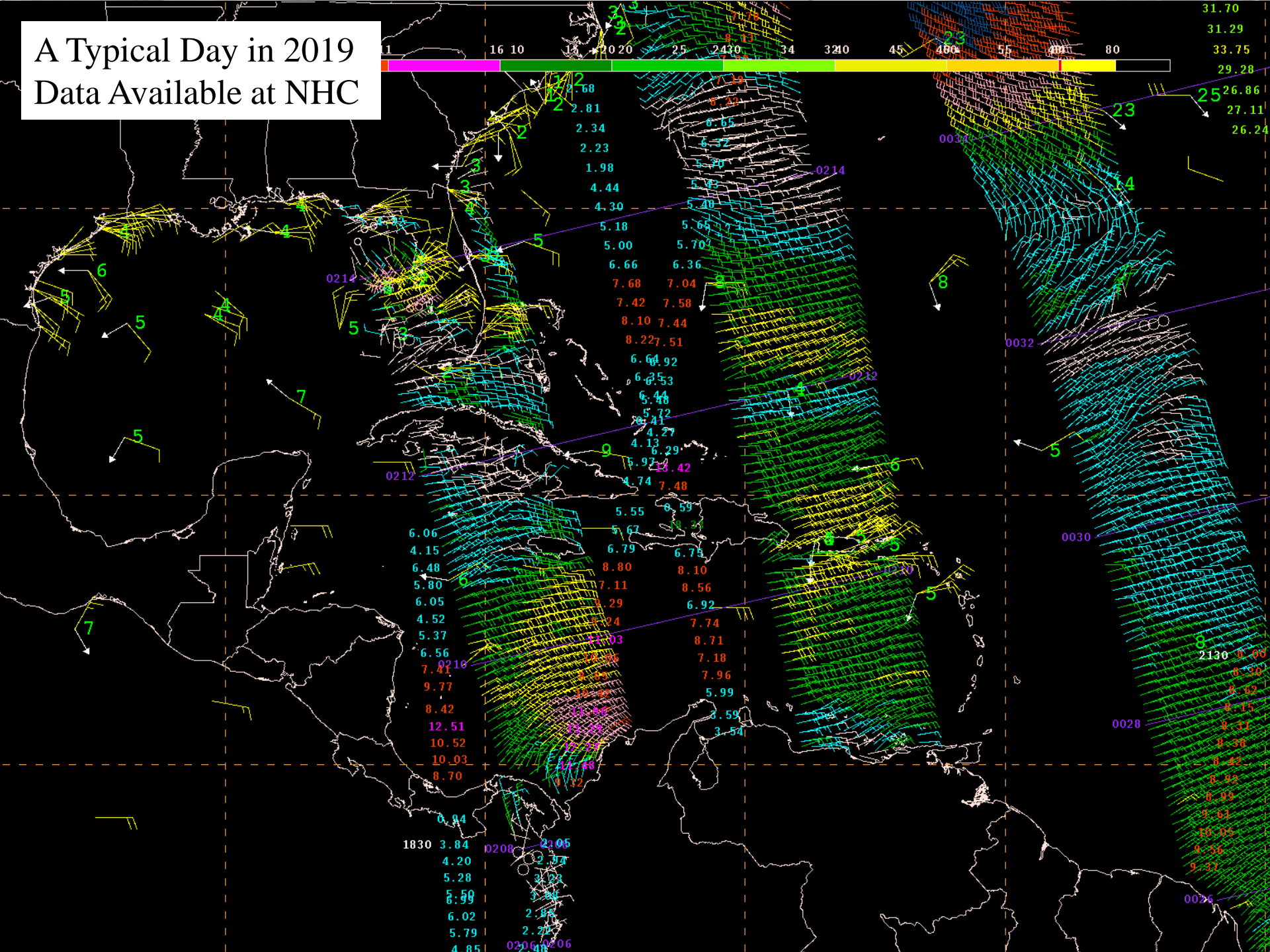


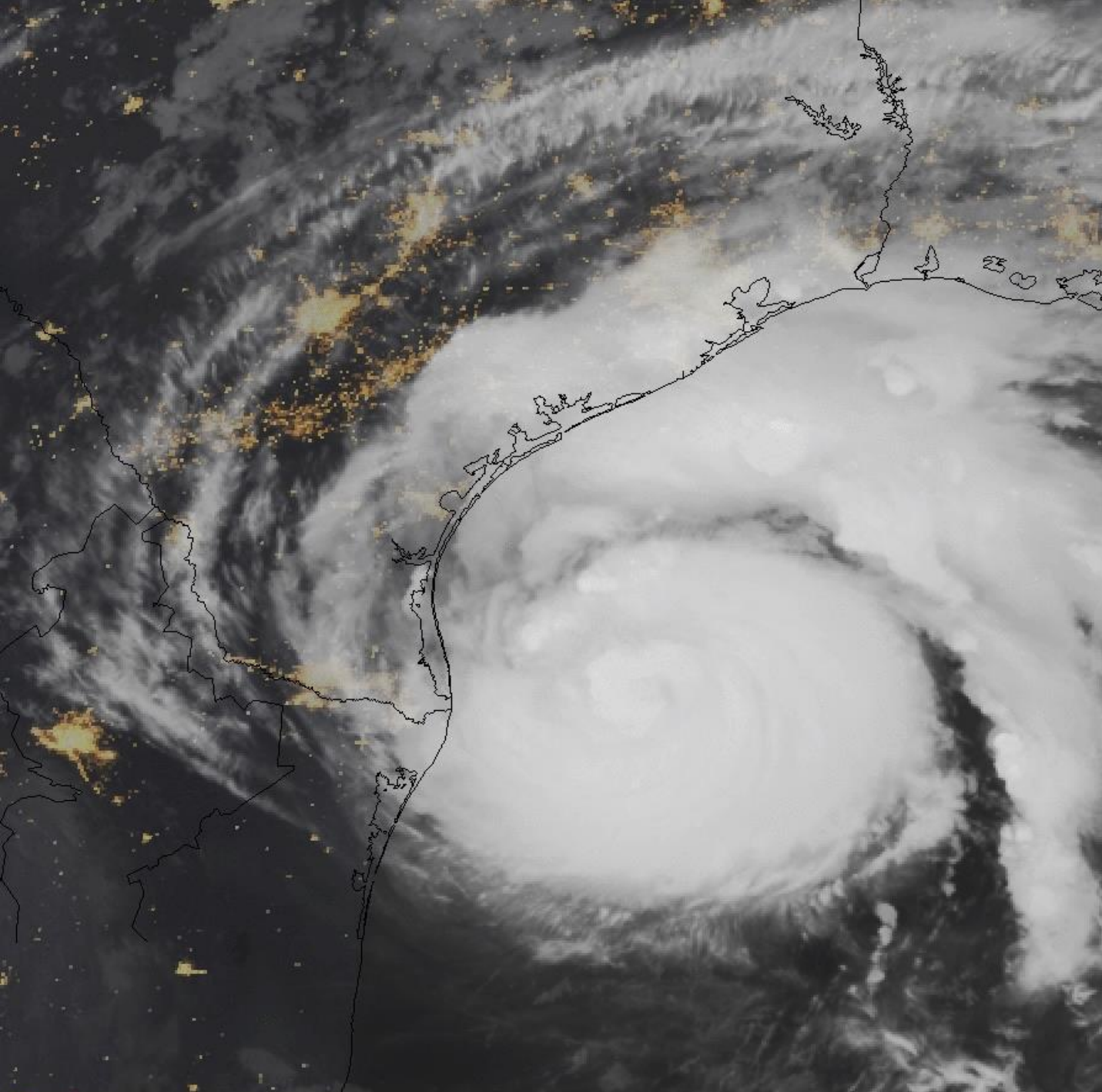
Ships over the Open Ocean



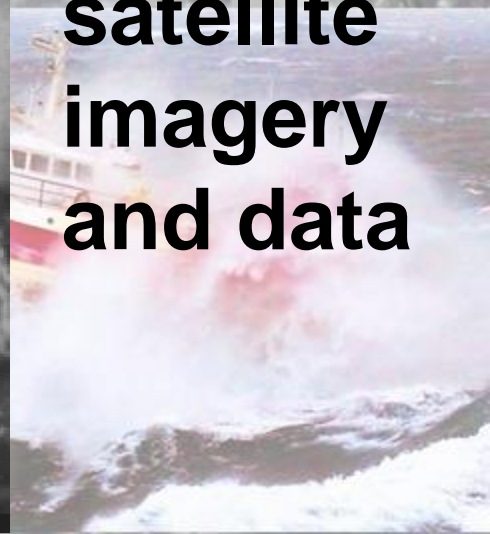
A Typical Day in 2019

Data Available at NHC





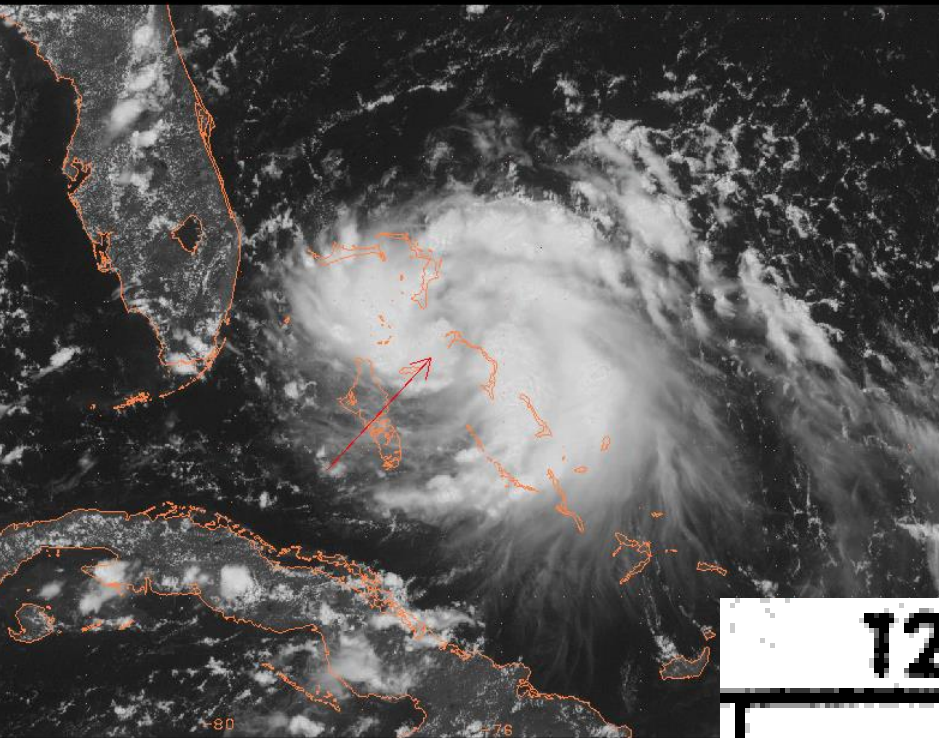
**GOES-16
and
GOES-17:
A new era
of geo-
stationary
satellite
imagery
and data**



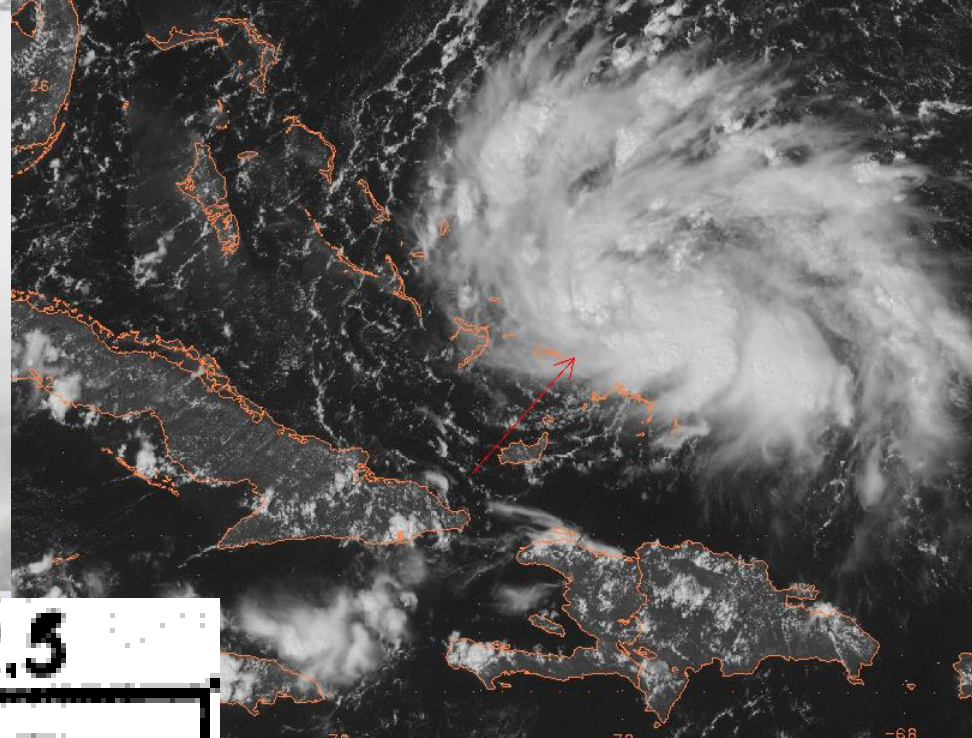
Satellite Imagery – Dvorak Technique

Katrina August 24

Rita September 18



GOES12 VIS 25.2 -77.1 20050824_1745



GOES12 VIS 22.3 -72.6 20050918_1745

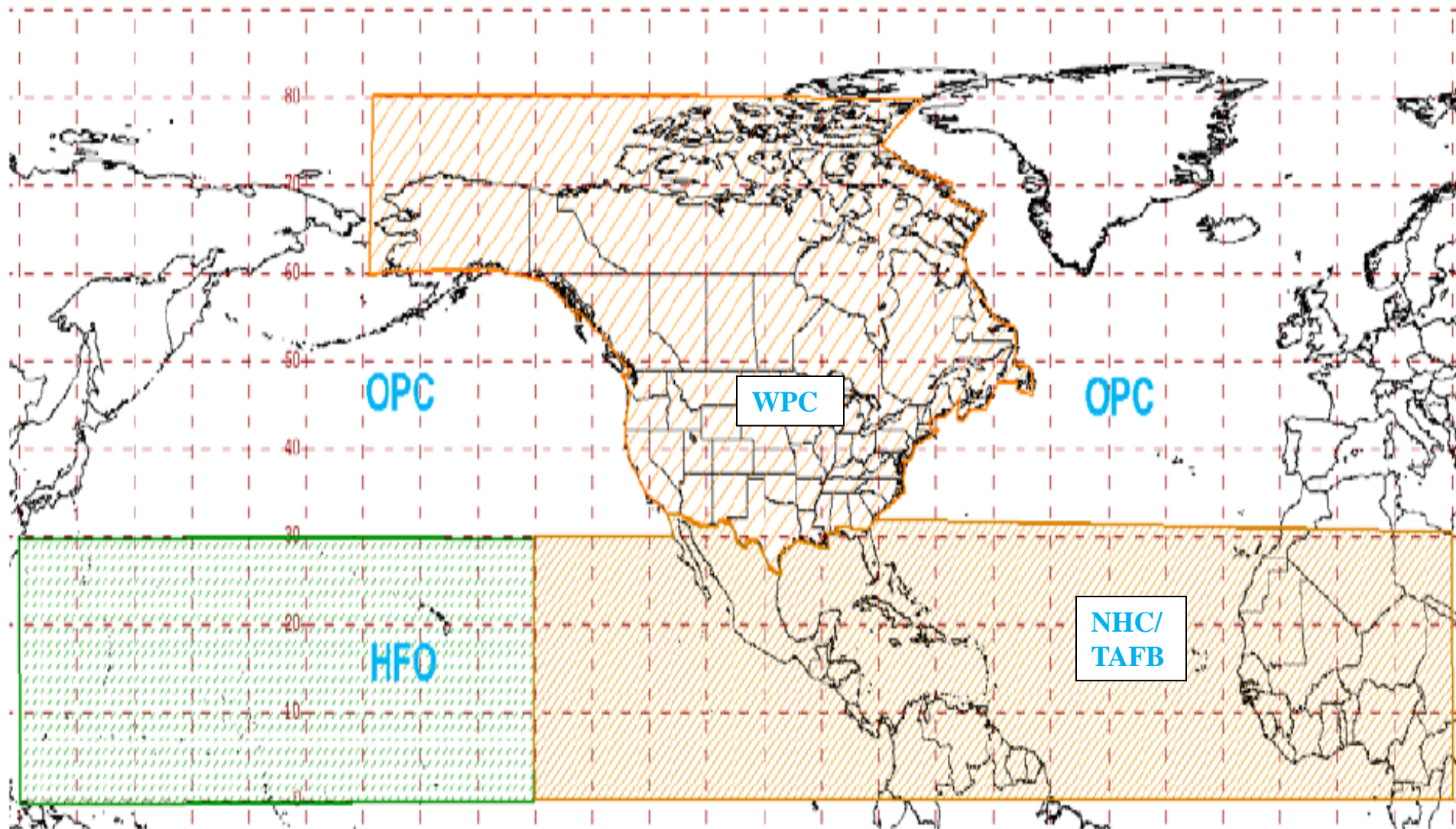
12.5



Unified Surface Analysis

Areas of Responsibility

https://www.nhc.noaa.gov/tafb_latest/USA_latest.gif



Tropical Weather Discussions

The Tropical Weather Discussion describes major synoptic weather features and significant areas of disturbed weather in the tropics.

<https://www.nhc.noaa.gov/text/MIATWDAT.shtml>

Content:

Special Features

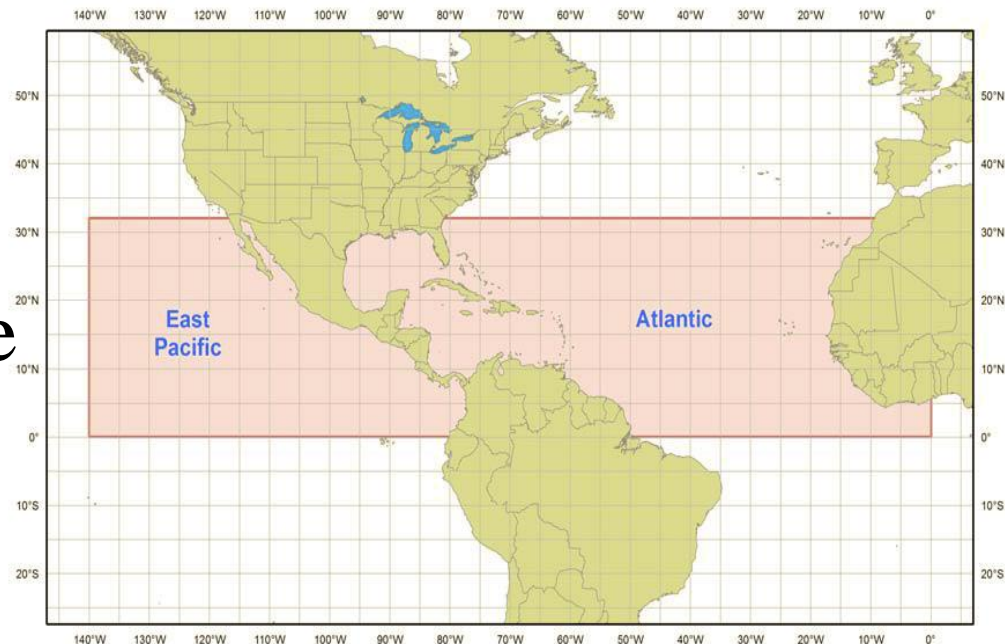
- Tropical Disturbances
- Tropical Cyclones
- Gales/Storm/Hurricane

Warnings

Tropical Waves

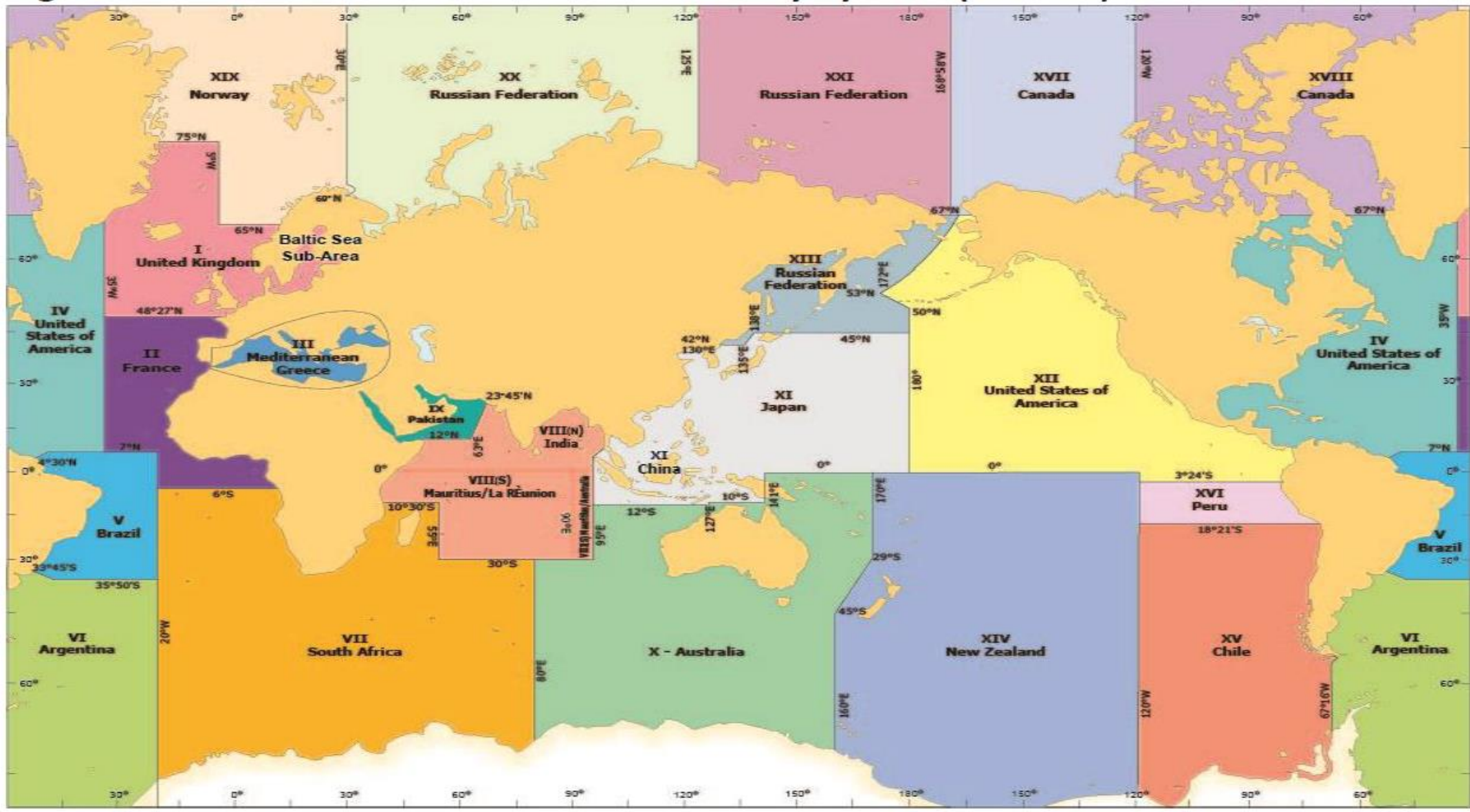
ITCZ

Discussion

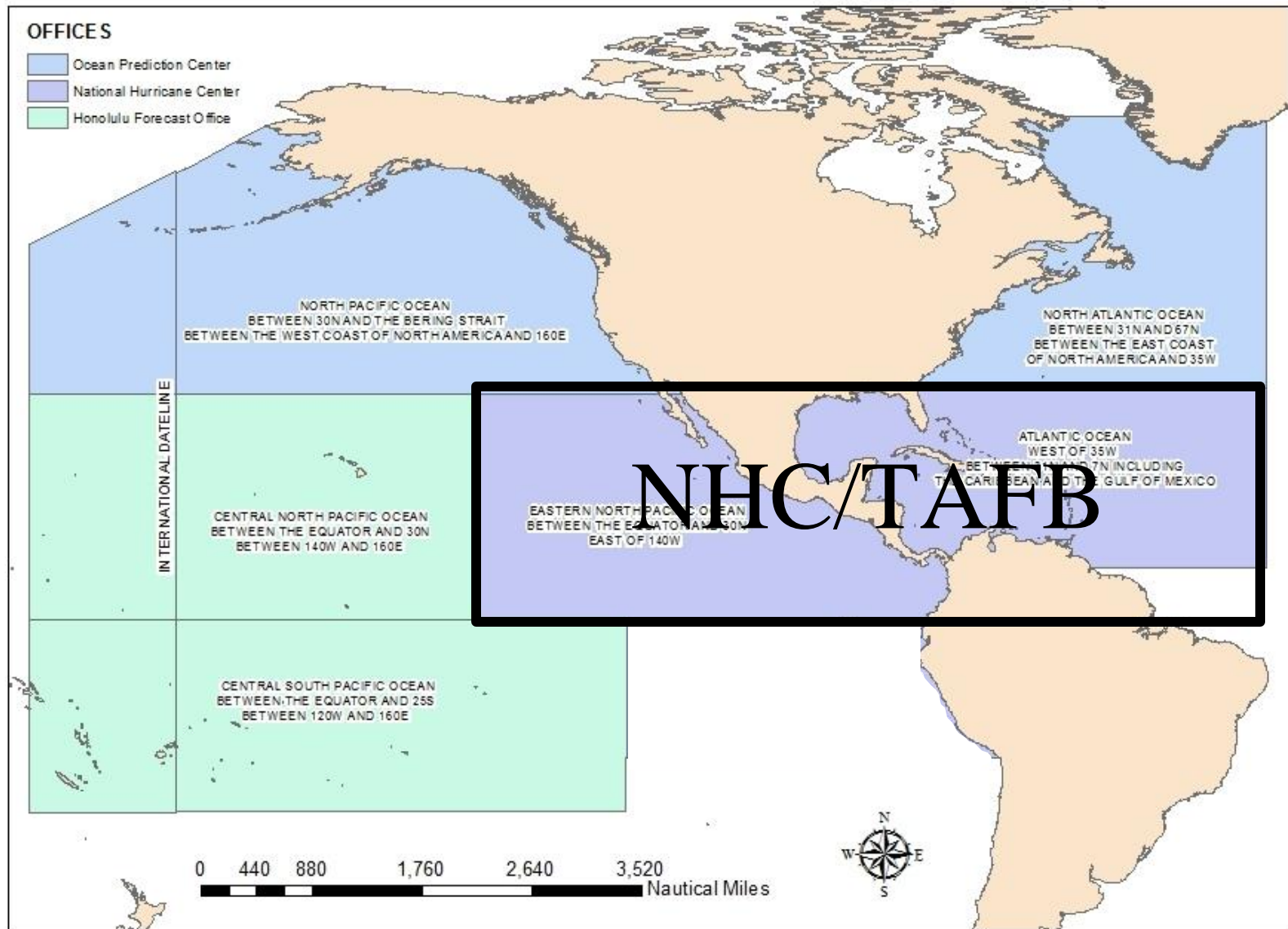


Global High Seas Forecasts

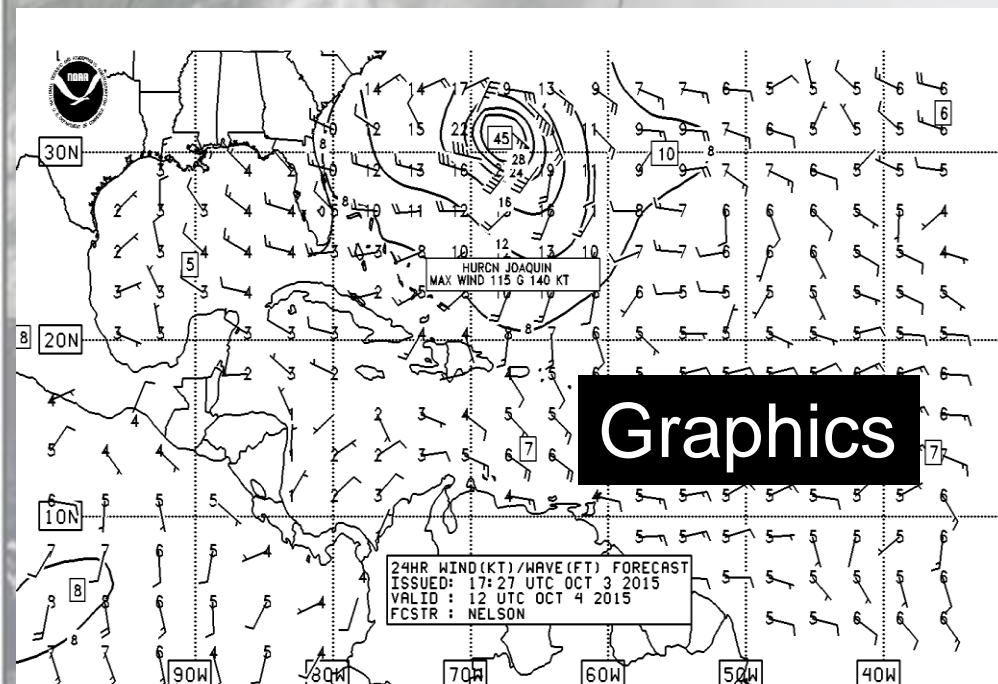
Areas of Responsibility



Three Ocean Forecast Centers in the NWS



NHC/TAFB Wind and Wave Forecasts



High Seas and Offshores Text Forecasts

HIGH SEAS FORECAST
NWS NATIONAL HURRICANE CENTER
1030 UTC FRI OCT 02 2015

SUPERSEDED BY NEXT ISSUANCE IN 6 HOURS

SEAS GIVEN AS SIGNIFICANT WAVE HEIGHT...WHICH IS THE AVERAGE HEIGHT OF THE HIGHEST 1/3 OF THE WAVES. INDIVIDUAL WAVES MAY BE MORE THAN TWICE THE SIGNIFICANT WAVE HEIGHT.

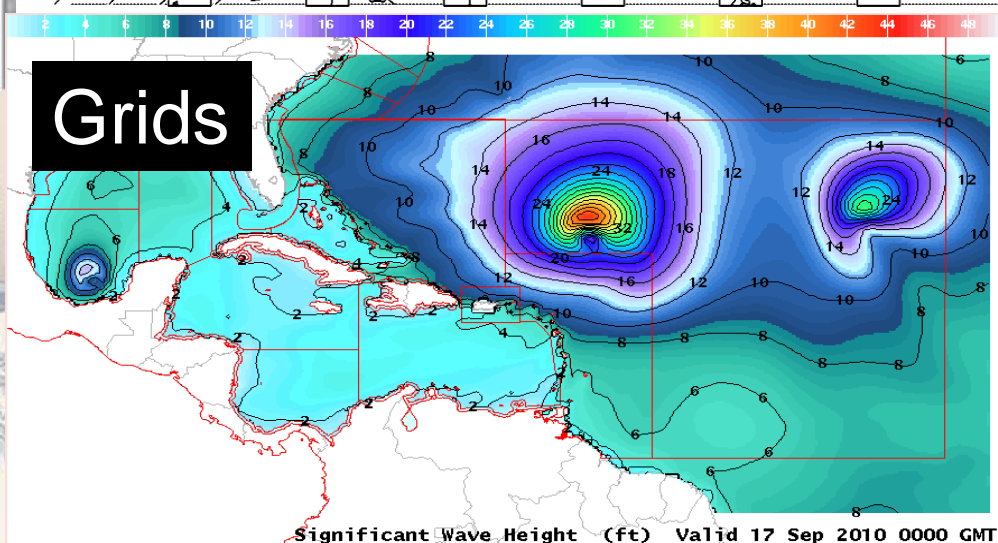
PAN PAN

ATLANTIC FROM 07N TO 31N W OF 35W INCLUDING CARIBBEAN SEA AND GULF OF MEXICO.

SYNOPSIS VALID 0600 UTC FRI OCT 02.
24 HOUR FORECAST VALID 0600 UTC SAT OCT 03.
48 HOUR FORECAST VALID 0600 UTC SUN OCT 04.

.WARNINGS.

...HURRICANE WARNING...
.HURRICANE JOAQUIN NEAR 23.3N 74.7W 935 MB AT 0900 UTC OCT 02 MOVING NW OR 315 DEG AT 3 KT. MAXIMUM SUSTAINED WINDS 115 KT GUSTS 140 KT. TROPICAL STORM FORCE WINDS WITHIN 160 NM W SEMICIRCLE...140 NM NE QUADRANT AND 180 NM SE QUADRANT. SEAS 12 FT OR GREATER WITHIN 400 NM NE QUADRANT...150 NM SE QUADRANT...120 NM SW QUADRANT...AND 300 NM NW QUADRANT WITH SEAS TO 39 FT. ELSEWHERE S OF 28N BETWEEN 70W AND 78W WINDS 20 TO 33 KT. SEAS 9 TO 12 FT. N OF 28N BETWEEN 70W AND 75W E WINDS 20 TO 25 KT SEAS 8 TO 10 FT. REMAINDER OF AREA N OF 21N BETWEEN 65W AND 78W AND OUTSIDE OF THE BAHAMAS WINDS 20 KT OR LESS. SEAS 8 TO 11 FT IN MIXED SWELL.



TAFB High Seas

- High Seas Forecast is a text forecast issued primarily for large ocean going vessels.
- High Seas Forecast includes synopsis of primary weather features and a 48 hour forecast.
- High Seas Forecast primarily for strong winds (25 KT or greater) and/or seas 8 FT or higher.
- TAFB issues two text high seas forecasts four times a day.



<https://www.nhc.noaa.gov/text/MIAHSFAT2.shtml>

- OFF's are designed for recreational/smaller fishing vessels up to giant cargo/cruise ships.

- Warnings are issued for conditions up to 48 hours from issuance time. A headline such as “**Gale** Conditions Possible” can be included for events beyond 48 hours.

- **Tropical Storm** and **Hurricane** Warnings normally based on **34kt/64kt** wind radii given in the tropical cyclone advisory.

<https://www.nhc.noaa.gov/marine/offshores.php>

TAFB Offshore Zones



- Currently, Offshore Waters Forecasts extend out 5 days
- Winds less than 5 ft are described as “Variable Wind Less than 5 kt”

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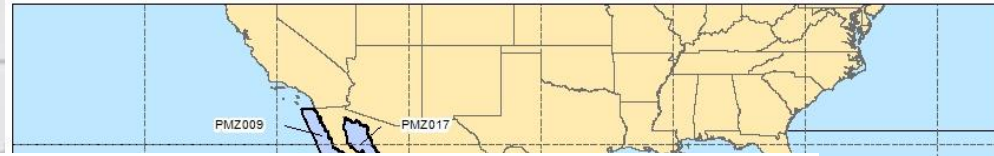
https://www.nhc.noaa.gov/marine/offshores_eastpac.php

TAFB Offshore Zones



- Currently, Offshore Waters Forecasts extend out 5 days.
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TAFB Offshore Zones



Became official new
National Weather
Service product on
April 16th, 2019



ers
ys.

wind radii given in the
tropical cyclone advisory.

described as “Variable Wind
Less than 5 kt”

<https://www.nhc.noaa.gov/experimental/epoffshores/data/WRKOFFPZ7>

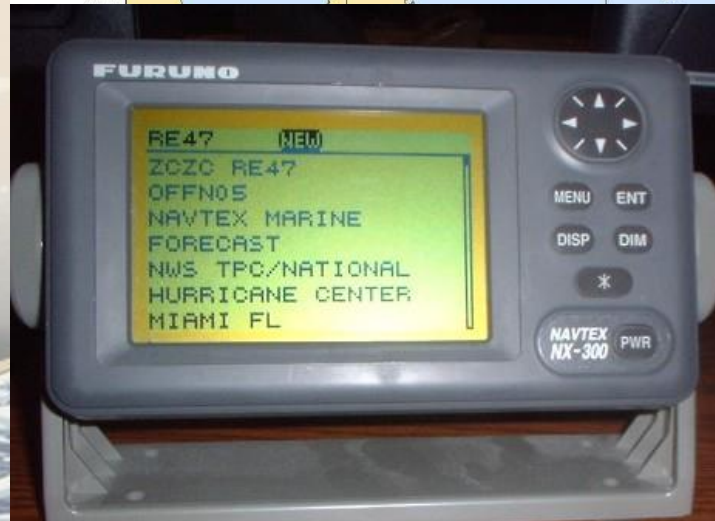
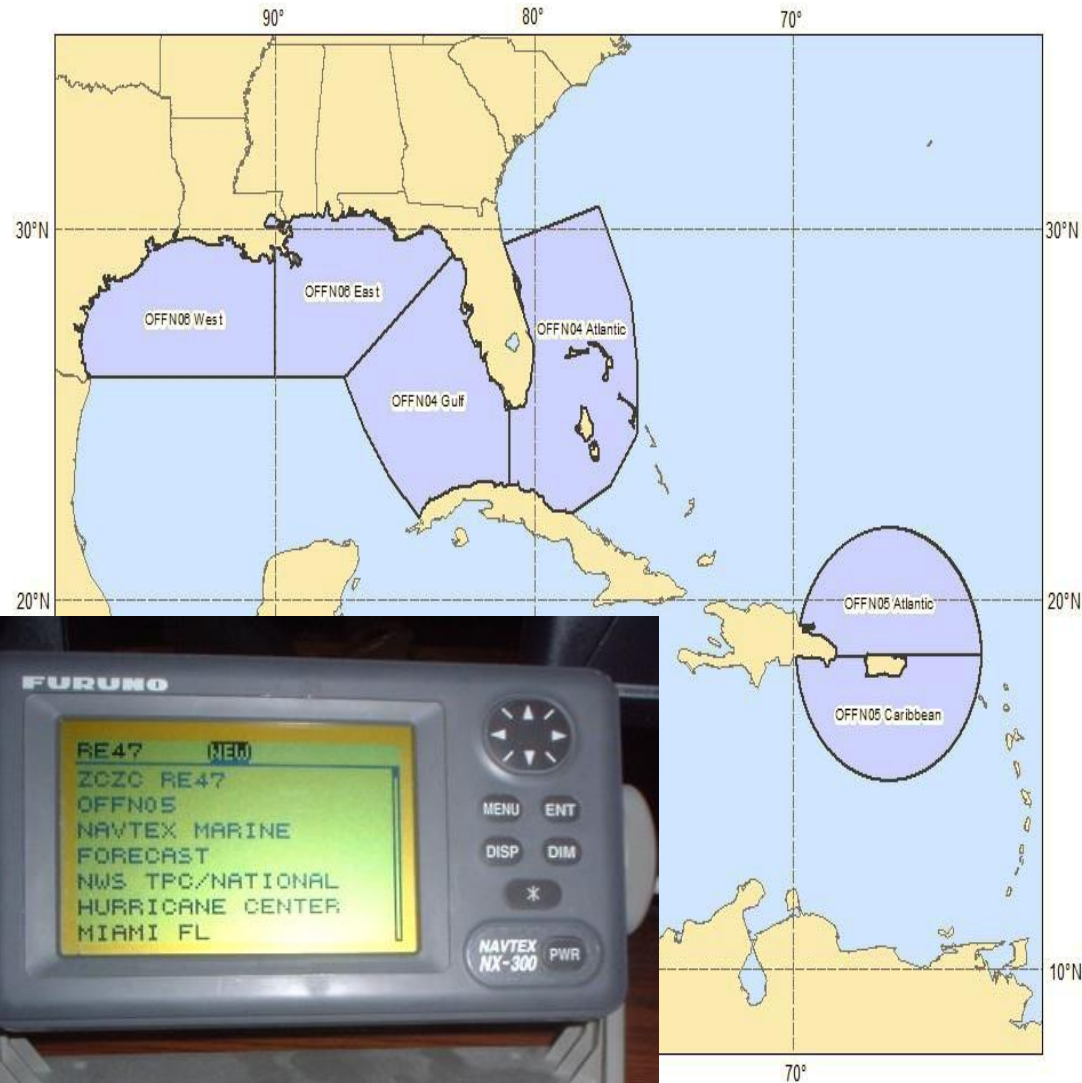
Navigational Telex (NAVTEX)

NAVTEX is an internationally required broadcast of coastal urgent marine safety information to ships.

In the United States there are 12 U.S. Coast Guard transmitter locations. TAFB products are transmitted from Miami, San Juan, and New Orleans, and contribute to the Charleston broadcast.

<https://www.nhc.noaa.gov/text/MIAOFFN04.shtml>

NAVTEX Zones



High Frequency Voice Broadcasts (VOBRA)

The USCG broadcasts basic weather information prepared by the NWS (**Ocean Prediction Center**, **National Hurricane Center** and **Honolulu Forecast Office**) via high frequency voice broadcasts (VOBRA) to vessels operating in areas beyond the range of coastal NOAA Weather Radio.

The VOBRA forecasts are prepared at a lower resolution than the offshore forecasts.

<https://www.nhc.noaa.gov/text/MIAOFFN21.shtml>

VOBRA Zones



MARINE RADIOFAX

**TAFB provides graphical products for
three U.S. Coast Guard transmitters:**

NEW ORLEANS (NMG)

POINT REYES (NMC)

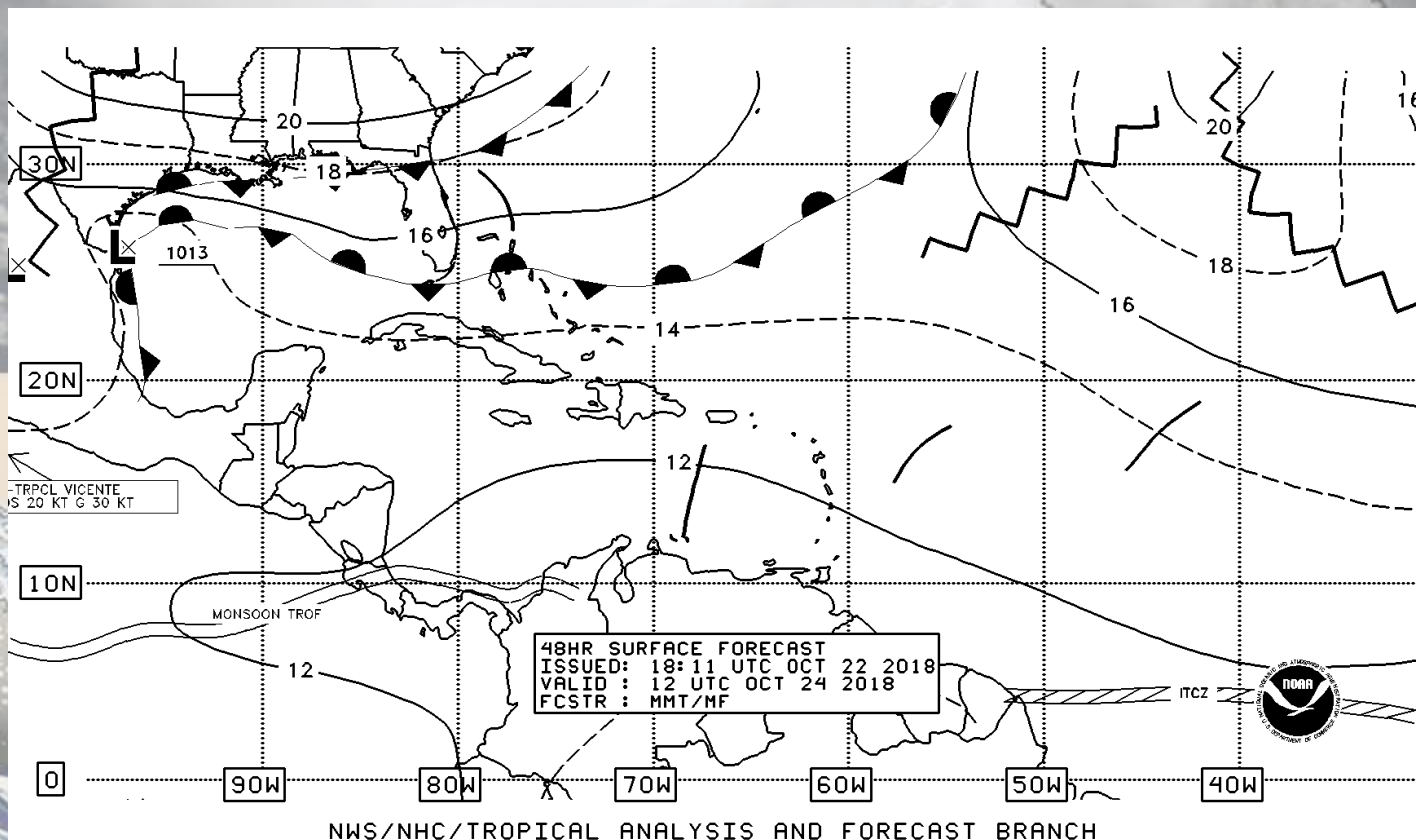
HAWAII (KVM70)



Surface Prog Graphics

- Fronts, troughs, tropical cyclones, tropical waves, ridges
- 24, 48, and 72 hr Forecasts
- W. Atlantic, Caribbean, Gulf of Mexico, and E. Pacific
- Issued twice daily

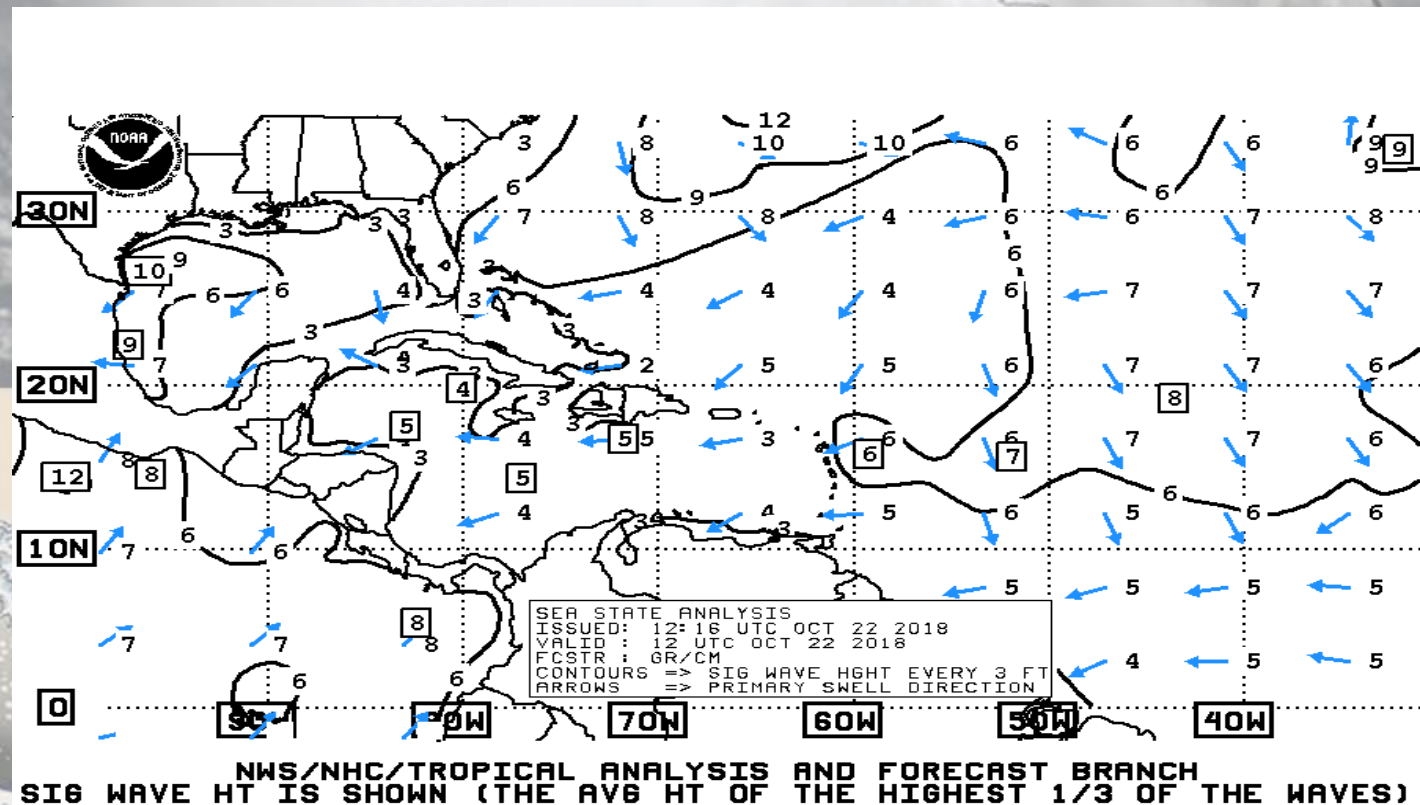
https://www.nhc.noaa.gov/tafb/latest/atlsfc72_latestBW.gif



Sea State Analysis Graphics

- Significant Wave Height Analysis (the average height of the highest one-third of the waves) and Primary Swell Direction
- W. Atlantic, Caribbean, Gulf of Mexico, and E. Pacific
- Issued twice daily

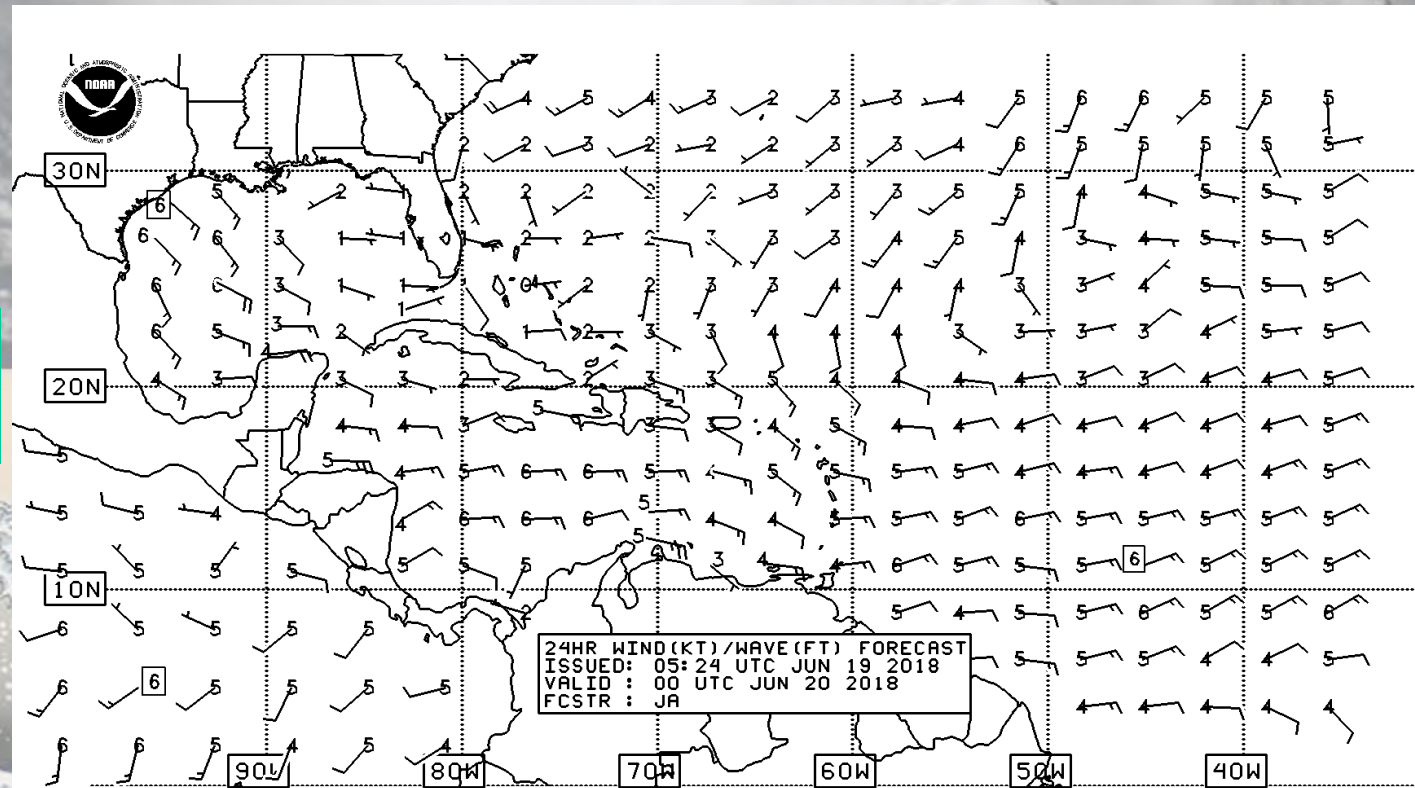
https://www.nhc.noaa.gov/atfb_latest/atlsea_latestBW.gif



WIND / WAVE Forecast Graphics

- Surface Winds and Significant Wave Height Predictions
- 24, 48, and 72 hr Forecasts
- W. Atlantic, Caribbean, Gulf of Mexico, and E. Pacific
- Issued twice daily

https://www.nhc.noaa.gov/tafb_latest/atl72_latestBW.gif

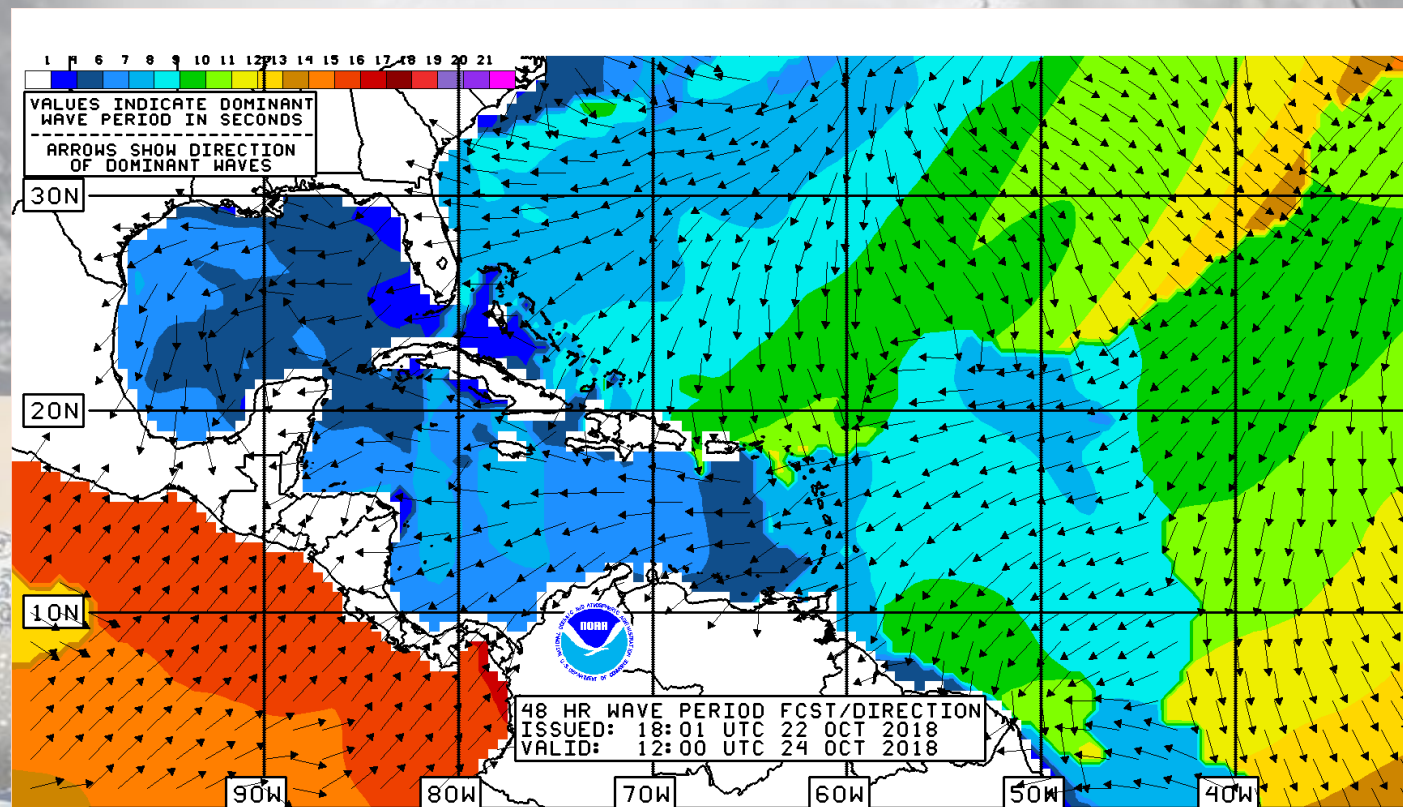


NWS/NHC/TROPICAL ANALYSIS AND FORECAST BRANCH
SIG WAVE HT IS SHOWN (THE AVG HT OF THE HIGHEST 1/3 OF THE WAVES)

WAVE PERIOD/DIRECTION Forecast Graphics

- Dominant wave period and direction
- 48 and 72 hr Forecasts
- W. Atlantic, Caribbean, Gulf of Mexico, and E. Pacific
- Issued twice daily

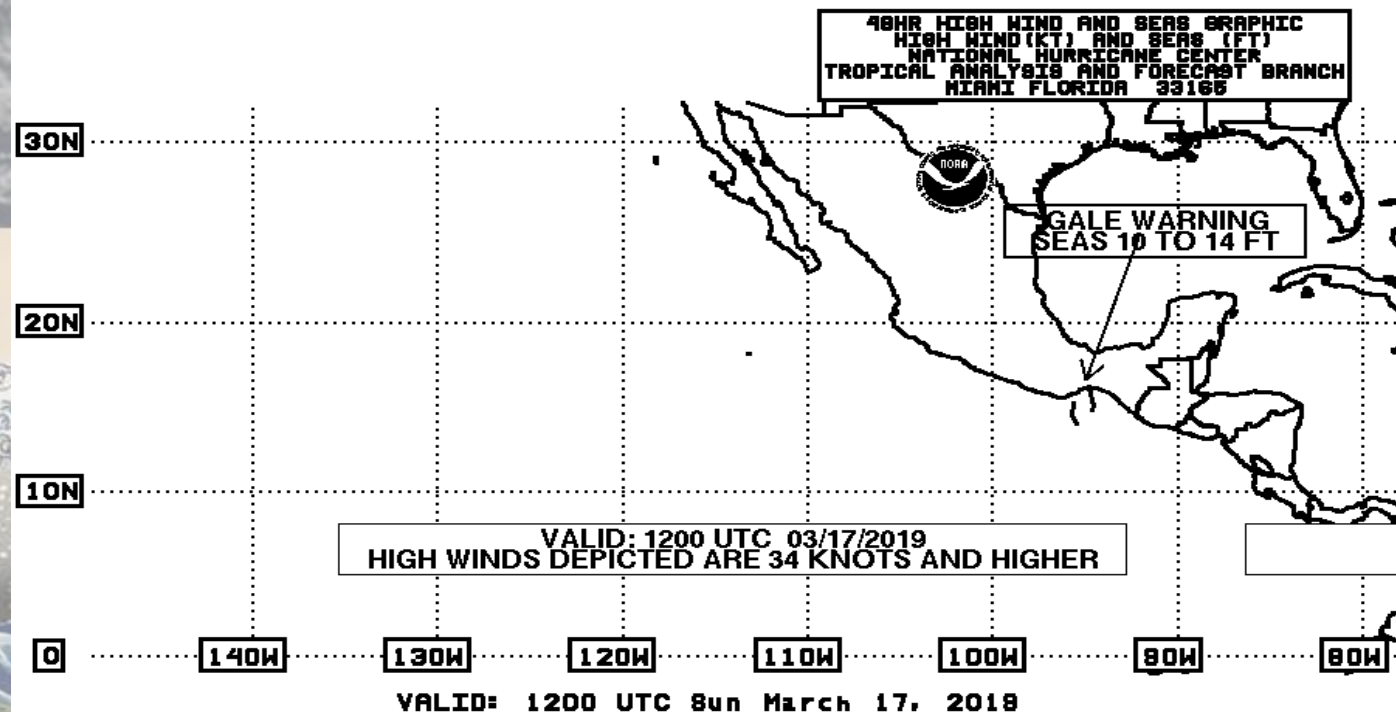
https://www.nhc.noaa.gov/tafb_latest/atl48per_latest.gif



High Wind and Seas Graphic

- 48 hr forecast depiction of Gale, Storm, and Hurricane-Force Wind Warnings (with peak seas)
- W. Atlantic, Caribbean, Gulf of Mexico, and E. Pacific
- Issued four times daily
- Issued 1 December to 14 May

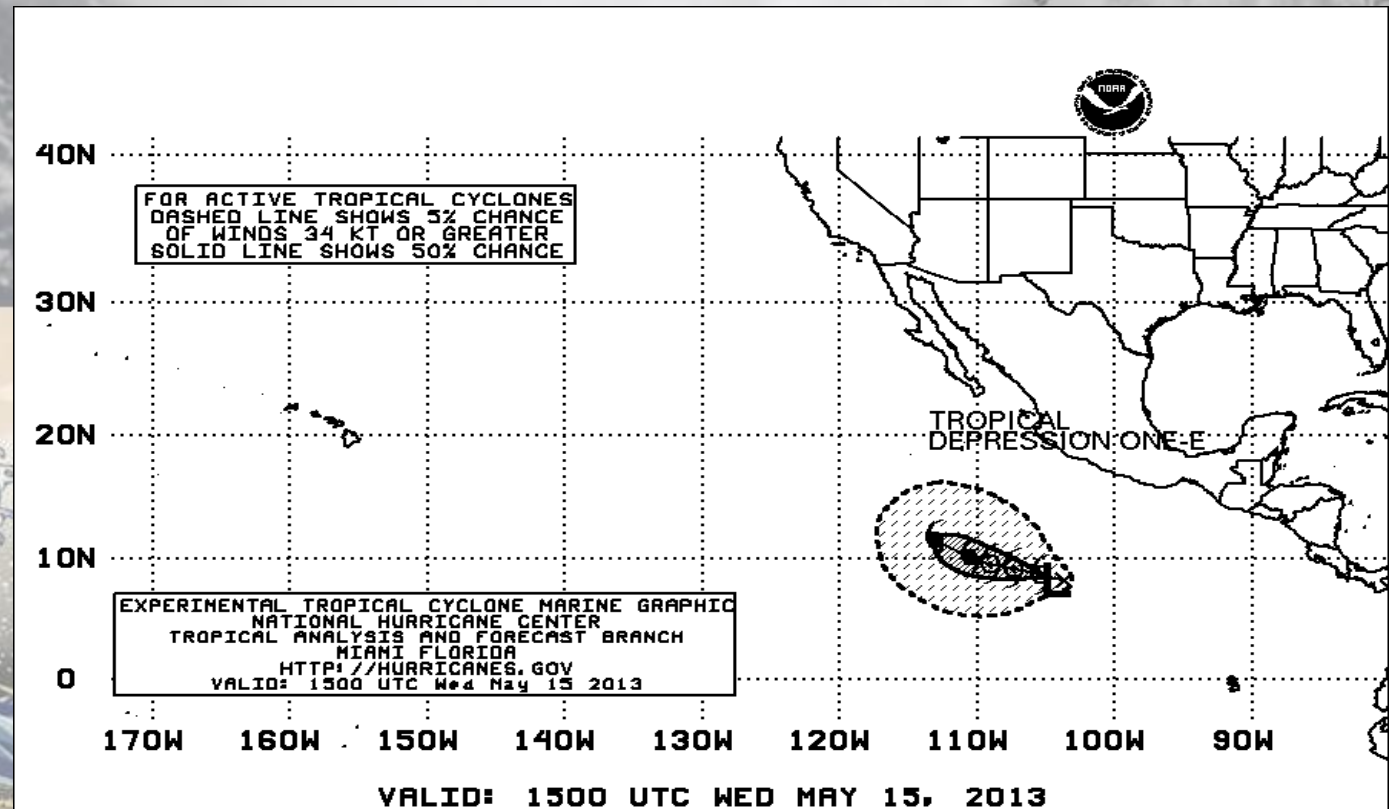
https://www.nhc.noaa.gov/tafb/latest/hiwind_pac_lates
[tBW.gif](#)



Tropical Cyclone Danger Graphic

- Wind Speed Probabilities-Based – Uses 5% and 50% chance of 34 kt (tropical storm force winds)
- 5 Day Forecasts
- W. Atlantic, Caribbean, Gulf of Mexico, and E. Pacific
- Issued four times daily during hurricane season

https://www.nhc.noaa.gov/tafb/latest/danger_atl_latestBW.gif



TAFB National Digital Forecast Database

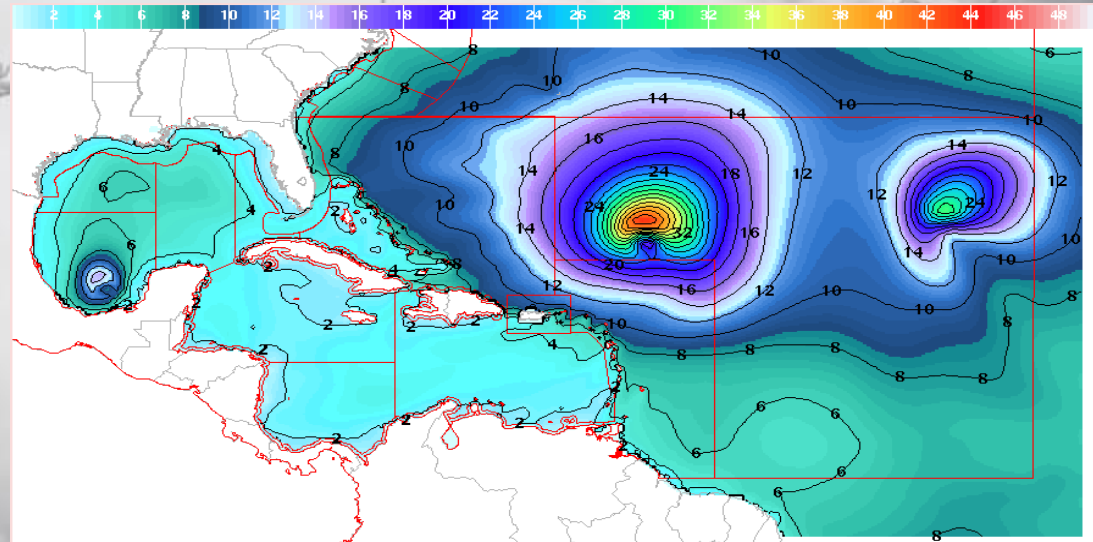
Gridded Marine Forecasts

Spatial/Temporal resolution

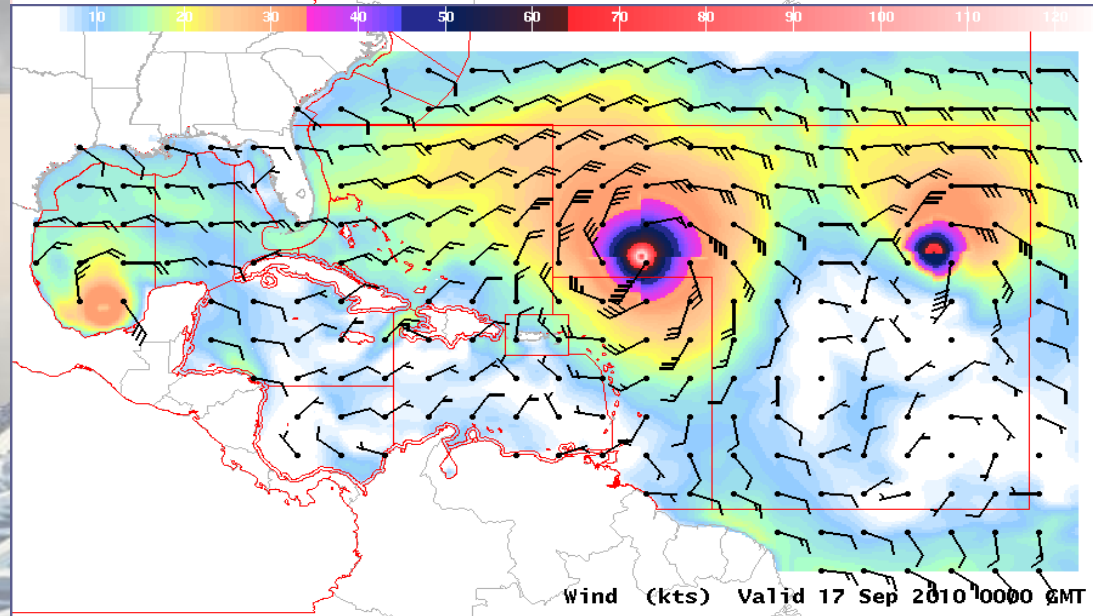
- 10 KM
- 6 Hourly out to 144 hr
(3 Hourly to 72 hr)

Parameters

- 10-M Wind/Gusts
- Significant Wave Height
- Hazards



Significant Wave Height (ft) Valid 17 Sep 2010 0000 GMT

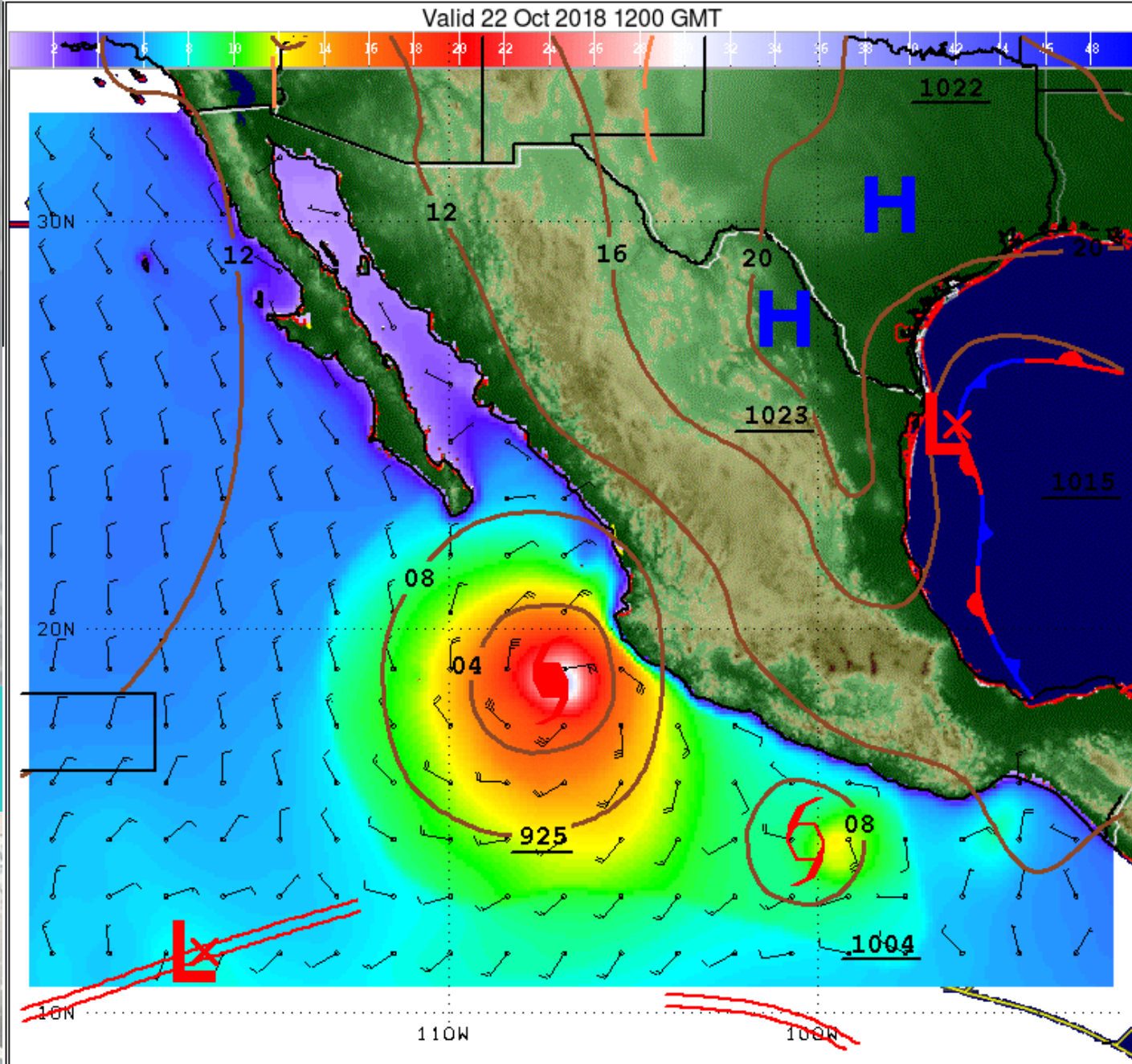


Wind (kts) Valid 17 Sep 2010 0000 GMT

<https://digital.weather.gov/>

Marine Composite Page – Winds, Waves, and Features

<https://www.nhc.noaa.gov/marine/forecast/enhanced/atlfull.php>

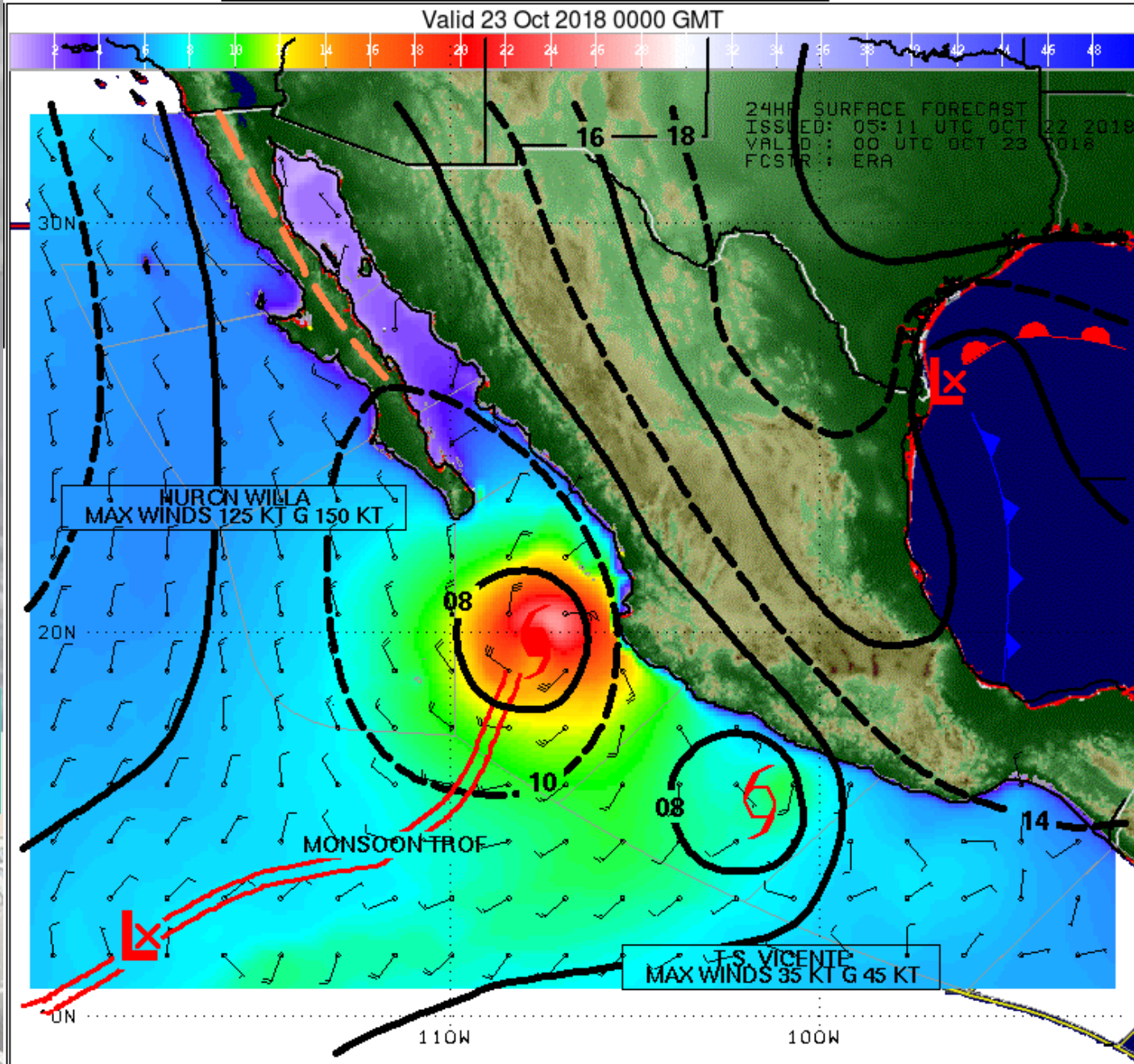


NHC/TAFB Experimental Gridded Marine Forecasts



Marine Composite Page – Winds, Waves, and Features

<https://www.nhc.noaa.gov/marine/forecast/enhanced/atcfull.php>

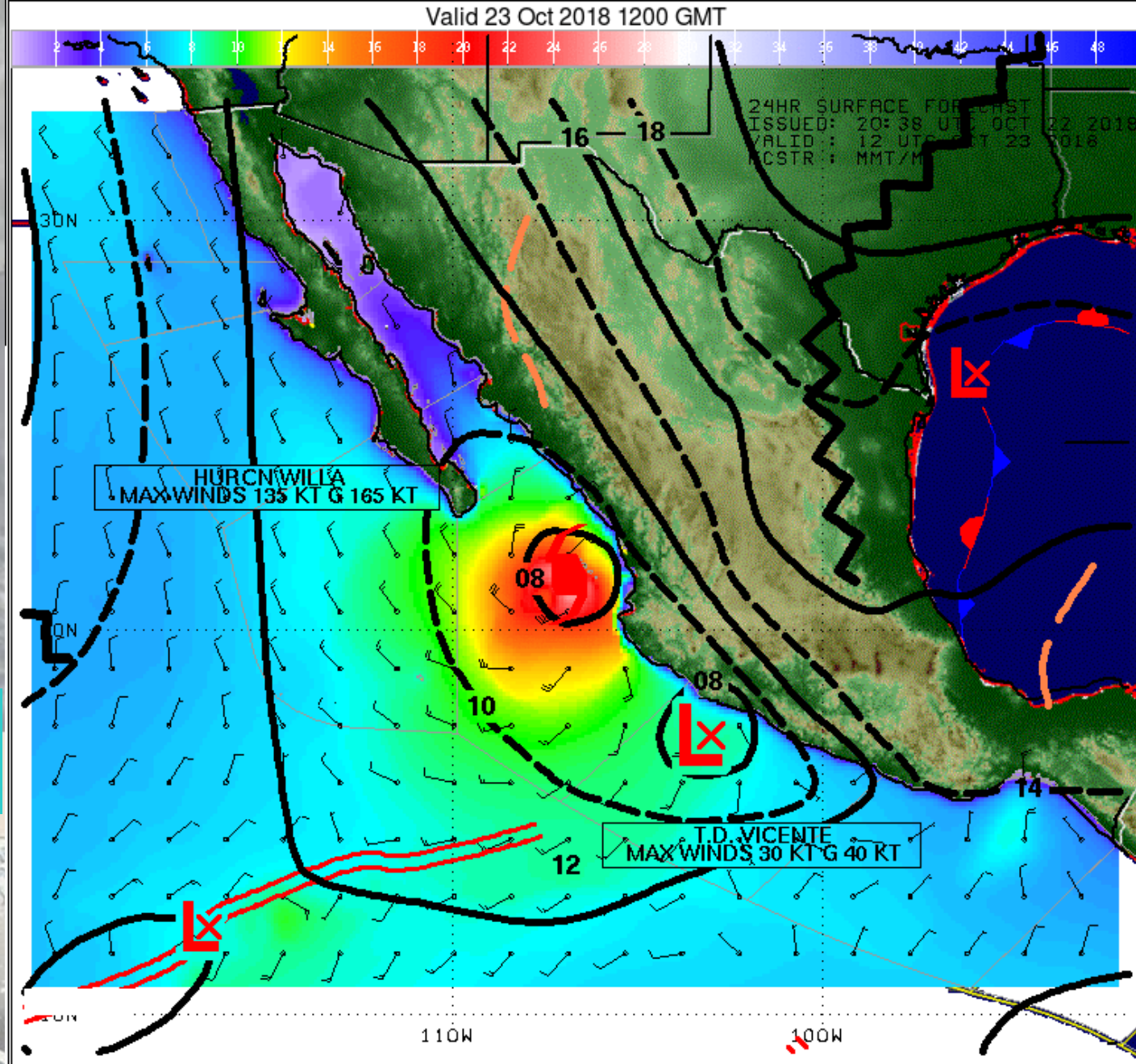


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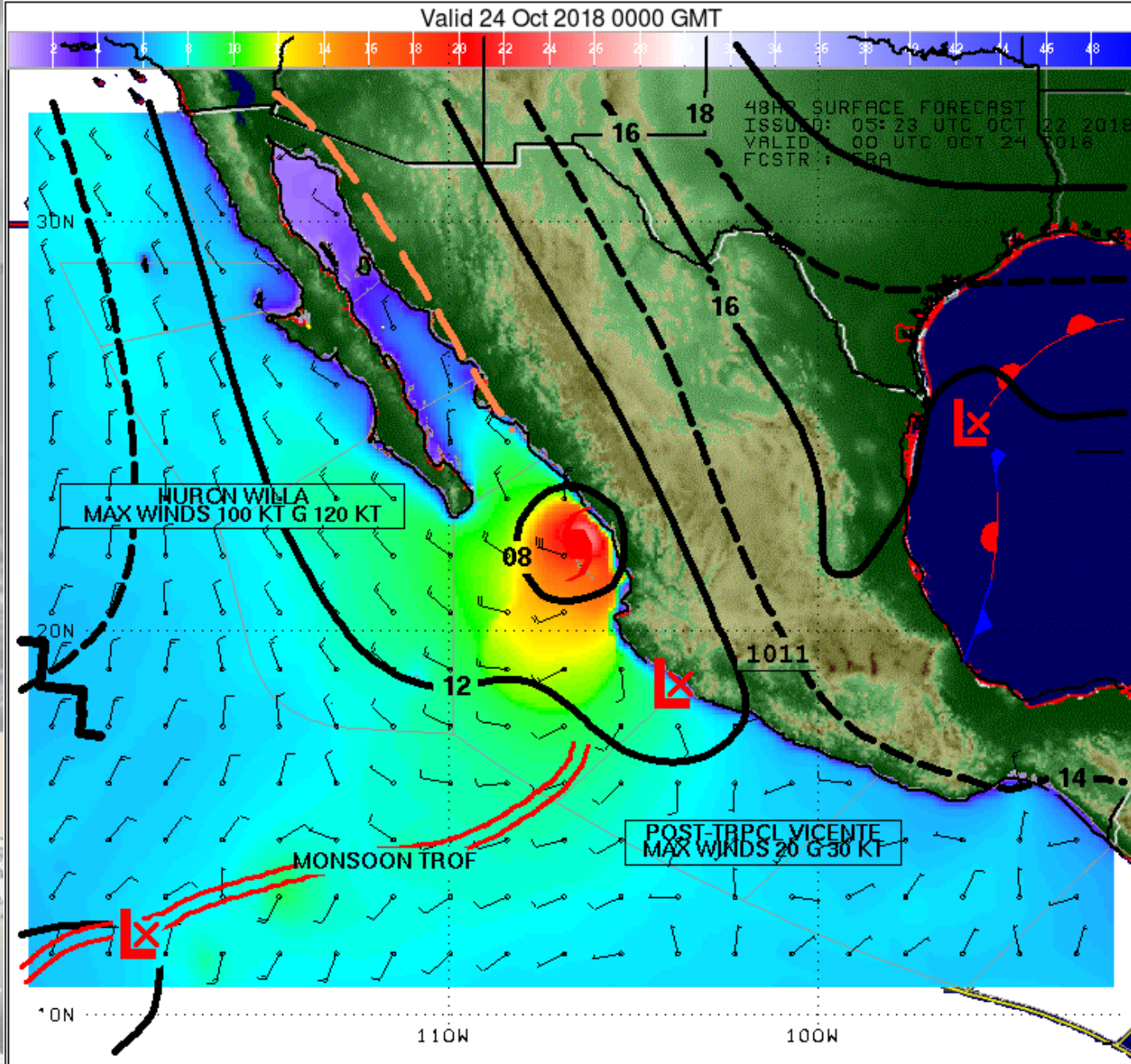


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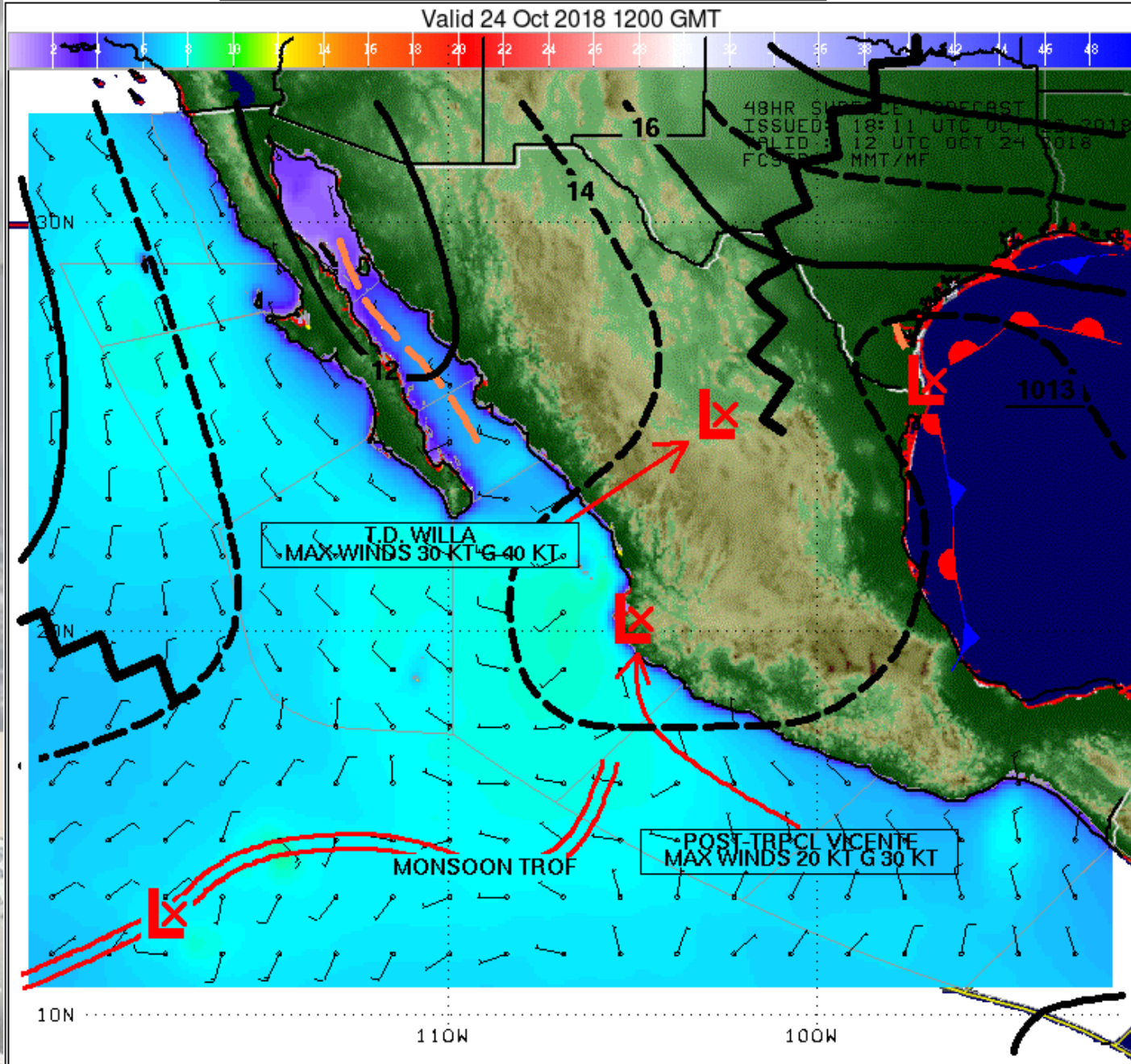


NHC/TAFFB Experimental Gridded Marine Forecasts



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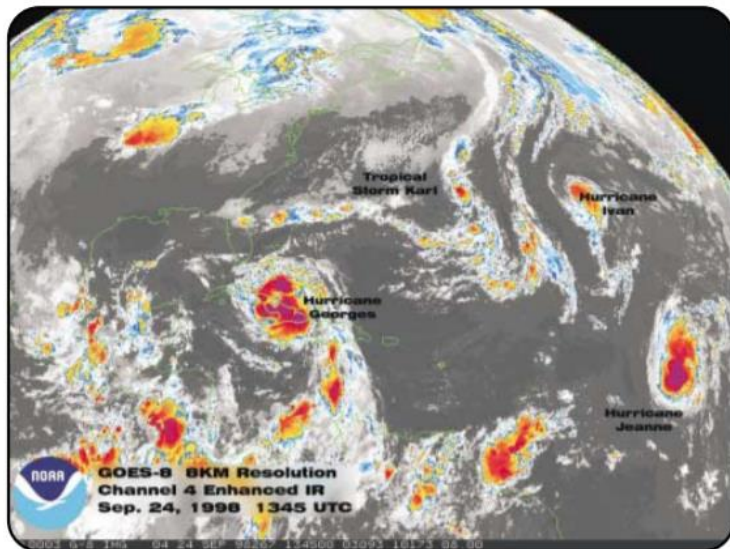


NHC/TAFB Experimental Gridded Marine Forecasts



Resources for Mariners

Mariner's Guide For Hurricane Awareness In The North Atlantic Basin



Eric J. Holweg
eholweg@nhc.noaa.gov

Meteorologist
Tropical Analysis and Forecast Branch
Tropical Prediction Center
National Weather Service
National Oceanic and Atmospheric Administration



August 2000



Marine Fact Sheet

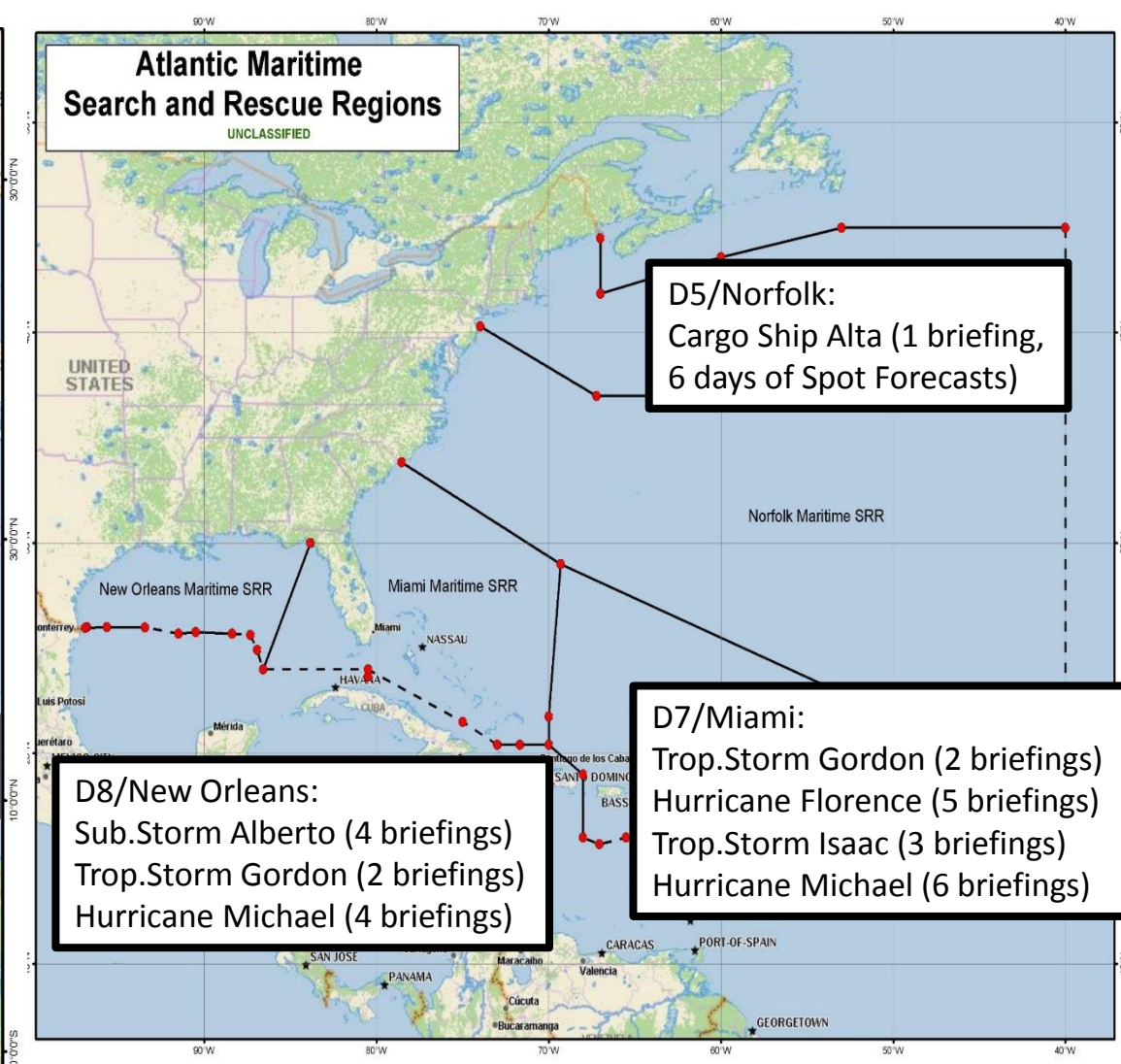
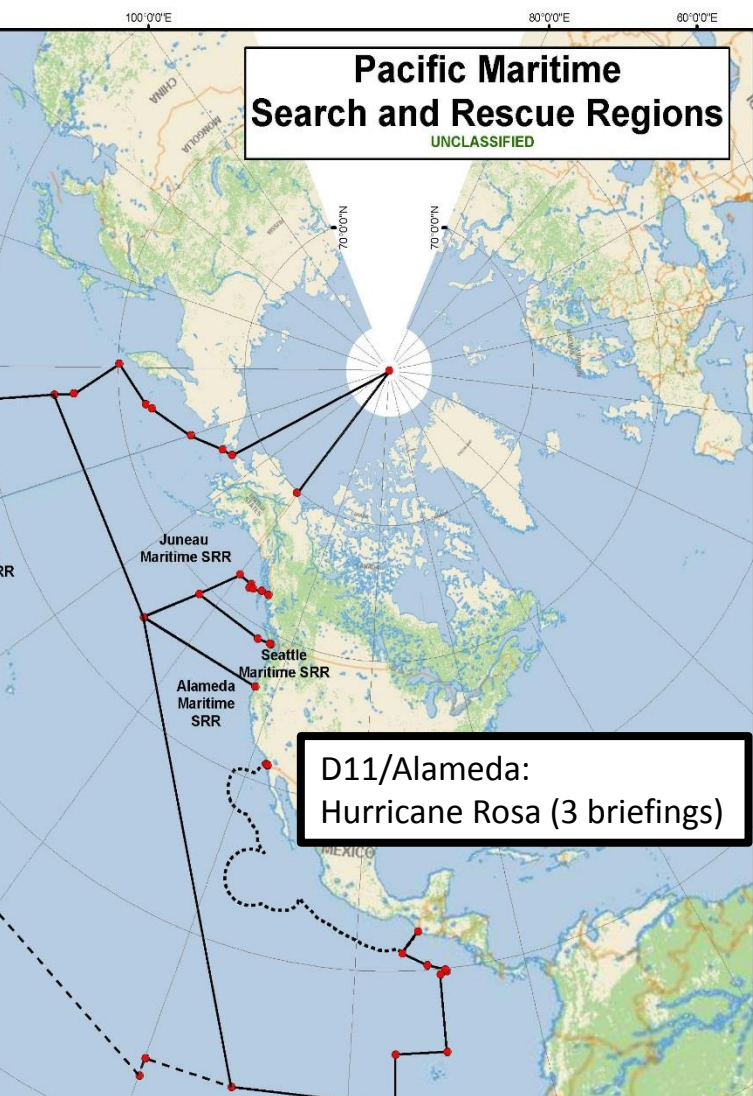


https://www.nhc.noaa.gov/marine/outreach/Marine_Fact_Sheet.pdf

<https://www.nhc.noaa.gov/marinersguide.pdf>



Decision Support Services to U.S. Coast Guard Districts by Tropical Analysis and Forecast Branch (TAFB)/ National Hurricane Center (NHC)/National Weather Service (NWS)



Tropical Analysis and Forecast Branch



National Hurricane Center/Tropical Analysis and Forecast Branch: Understanding Marine Forecast Products and Uncertainties

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<https://www.nhc.noaa.gov/marine/?atlc>